

Regulations, Codes and Standards Working Group Update Report

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Antonio Ruiz (Jay Keller alternate)**

Co-Chairs

***EC, **US**

November 14, 2012

Sevilla, Spain



Overview

- Background
- Update on Tank Testing Round Robin
- Reply to SC action items
- Other activities proposed



Background

Challenge and Approach:

Harmonized regulations, codes and standards (RCS) are essential to establishing a market-receptive environment for commercialization of Hydrogen and Fuel Cell Technologies. In May 2010 (Essen, Germany), IPHE SC endorsed the importance of the RCS Working Group (WG) in taking a leading role in harmonizing RCS.





Background

Benefit:

The RCSWG's role is to create and conduct a forum where potentially contentious and controversial issues of RCS are handled. The RCSWG can recommend a consensus solution and promote resolution of contentious issues within the technical realm of RCS. The RCSWG also conducts pre-normative work to globally harmonize the execution of testing relevant to RCS.



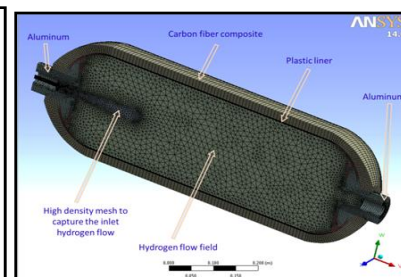
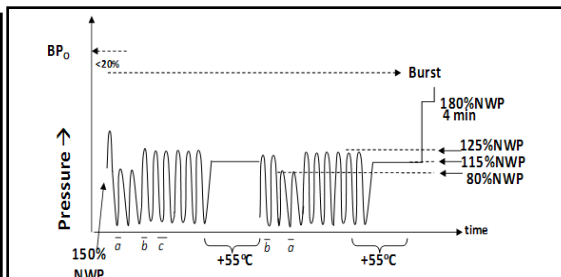
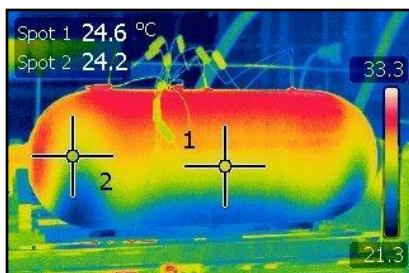


Progress on Type IV Tank Testing Round Robin Status Update

September 2011: Launched a multi-phase Round Robin (RR) testing program for composite pressure vessels (*Japan, UK, Brazil, EC, France, Canada, China, U.S.*)

Phase I: Individually defined a test measurement protocol that was combined to yield a harmonized protocol that will yield consistent results independent of test facility

Completed for hydraulic ✓

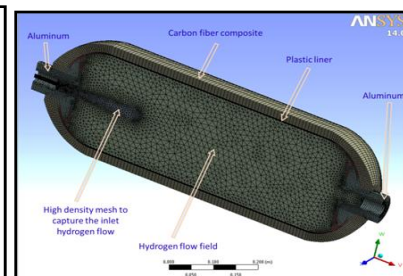
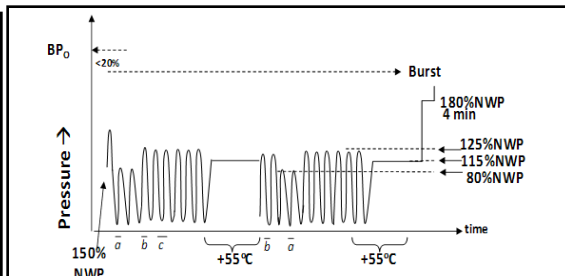
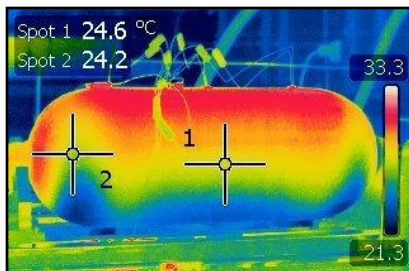




Progress on Type IV Tank Testing Round Robin Status Update

Phase II: Execute hydraulic and pneumatic cycle tests representative of proposed requirements for composite overwrapped pressure tanks (i.e, SAE J2579, GTR, EIHP Rev 12B)

- Four Type IV tanks from Lincoln Composites donated, additional 70 MPa Type IV tanks from CEA planned for Q1 to Q3 2013
- Hydraulic tests ongoing
- Pneumatic cycle tests to start Q1 2013 - EC, Q3 2013 - US



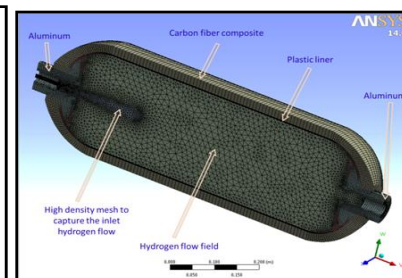
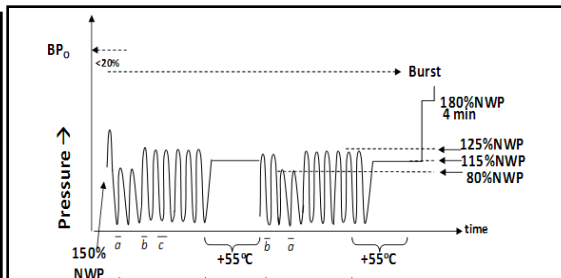
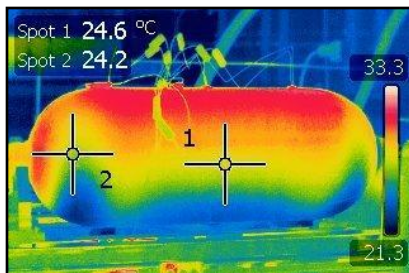


Progress on Type IV Tank Testing Round Robin Status Update

Phase II: Hydraulic cycle tests (up to 35 MPa)

- U.S. testing under way with real time web access to data acquisition computer 24/7 to any interested party
 - access granted and demonstrated to RCSWG members at the November 12 2012 meeting
 - download **Vsee.exe** from **Vsee.com**, supply an e-mail address, notify Jay Keller at 'Jay.O.Keller@gmail.com' for access

- China with site visits testing to commence
 - Site visit planned for the week of November 25



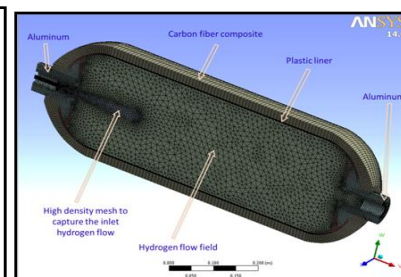
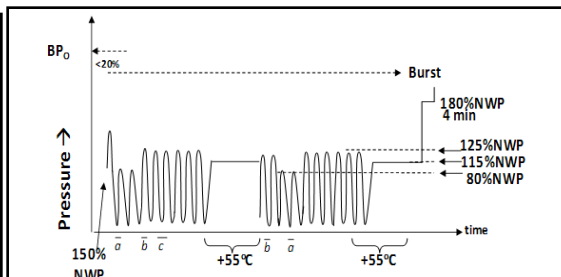
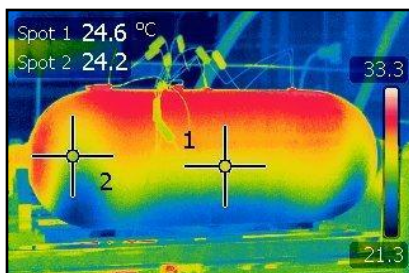


Progress on Type IV Tank Testing Round Robin Status Update

Pneumatic Testing 70 MPa

Exchange of US and EC test measurement results and verification

- Presentation of JRC/EC and SNL/US laboratory capabilities for pneumatic testing
- Identification of gaps for meeting requirements of the RR
 - *JRC facilities upgraded based on gaps identified*
 - *SNL facilities being upgraded (to be completed Q3 2013)*
- Discussion of numerical modeling capabilities, progress and potential input into RR



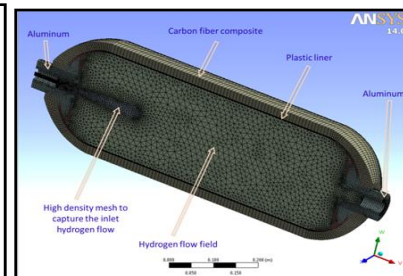
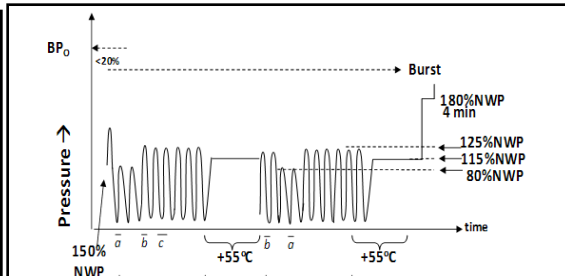
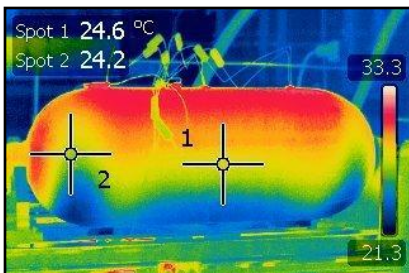


Progress on Type IV Tank Testing Round Robin

Next Steps

Pneumatic Testing 70 MPa

- Type IV tanks by CEA scheduled for late Q4 2012 and Q1 2013
- Phase I (cycle test definition): will take place Q1 2013
 - *Modified/adapted from hydraulic cycle test sequence*
- Phase II (cycle execution): will take place 2013
 - *Test will commence on one tank @ JRC, then with refinement of the test protocol based on the first results testing will proceed to SNL, with further testing @ JRC*
 - *Second round of CEA tanks may be instrumented with thermocouples at time of manufacture*





Response to SC Action Items

SC Action Item	RCSWG position	WG action proposed	IPHE dimension
Fuelling station: Fuel Quality	<ul style="list-style-type: none"> • Impact on commercialization • Resolve scientific & technical issues 	No	<ul style="list-style-type: none"> • Policy: Yes • Member countries coverage: Yes
Fuelling station: Metrology (metering)	<ul style="list-style-type: none"> • Impact on commercialization • Resolve scientific & technical issues 	Yes	<ul style="list-style-type: none"> • Policy: Yes • Member country different
Fuel quality: Effects on the Stack	<ul style="list-style-type: none"> • Impact on commercialization • Resolve scientific & technical issues 	Yes	<ul style="list-style-type: none"> • Policy: Yes • Member countries coverage: Yes



New Activities Proposed

Fueling Station Metrology (Metering) Proposal for New Activity

exploit outcomes of the pneumatic part of the tank testing RR

- As a direct result of the pneumatic RR there will be two laboratories (globally) that can perform mass flow rate measurements compliant with metrology requirements (OIML R139 - EU and NIST Handbook 44 - US) and the fill protocol (SAE J2601)
- This provides the opportunity for leveraging tank RR efforts: pre-normative issues related to metering will be addressed when appropriate metering devices become available



New Activities Proposed

Outcome from Previous Meetings

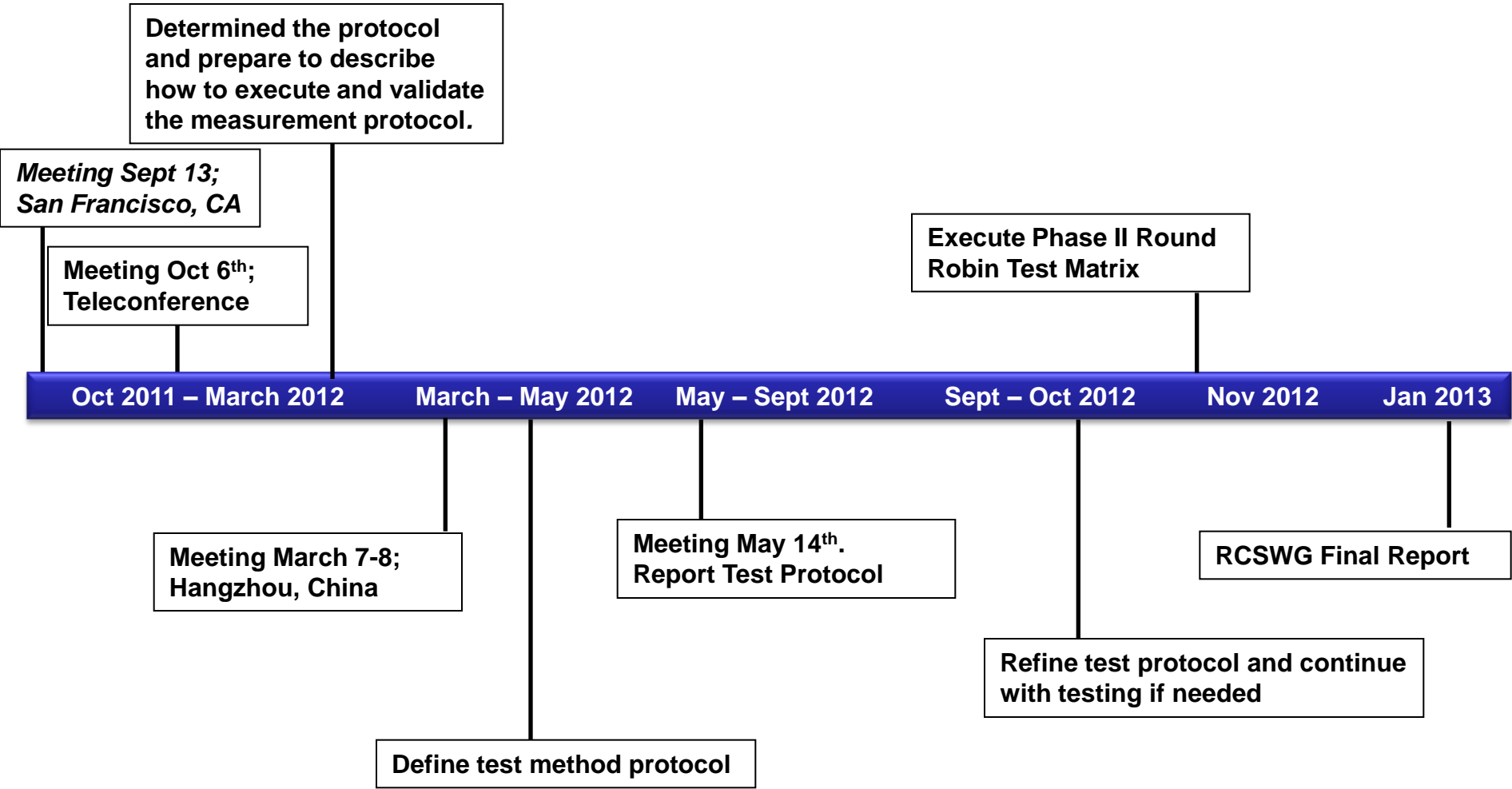
Proposal for New Activity

Launch a new RR on fuel quality effects on stack performance

- Currently 5 member countries have been identified (all are invited) to comprise a task force to define this new RR
- *RCSWG requests SC endorsement for this new activity*

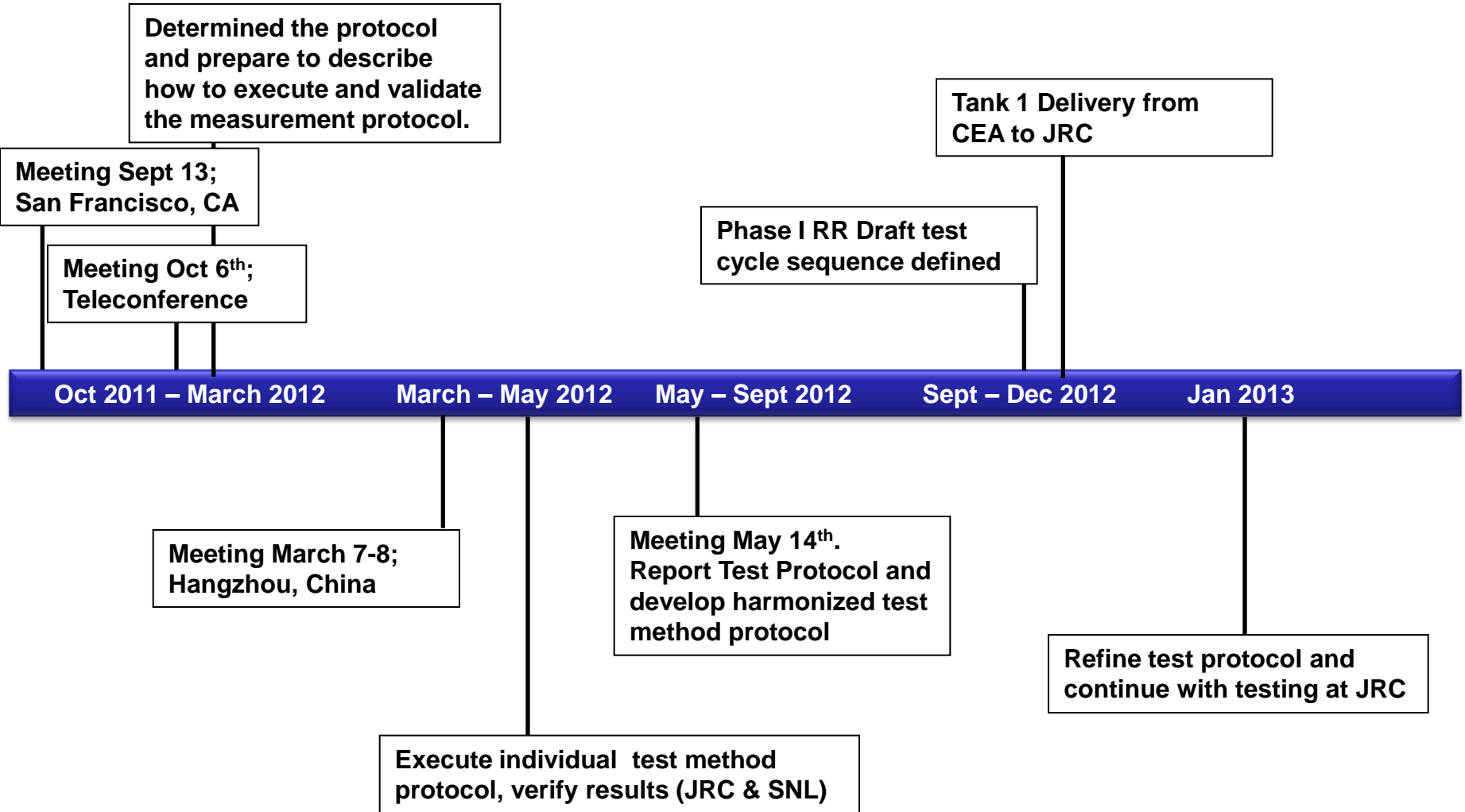


RCS WG Round Robin Timeline - Hydraulic



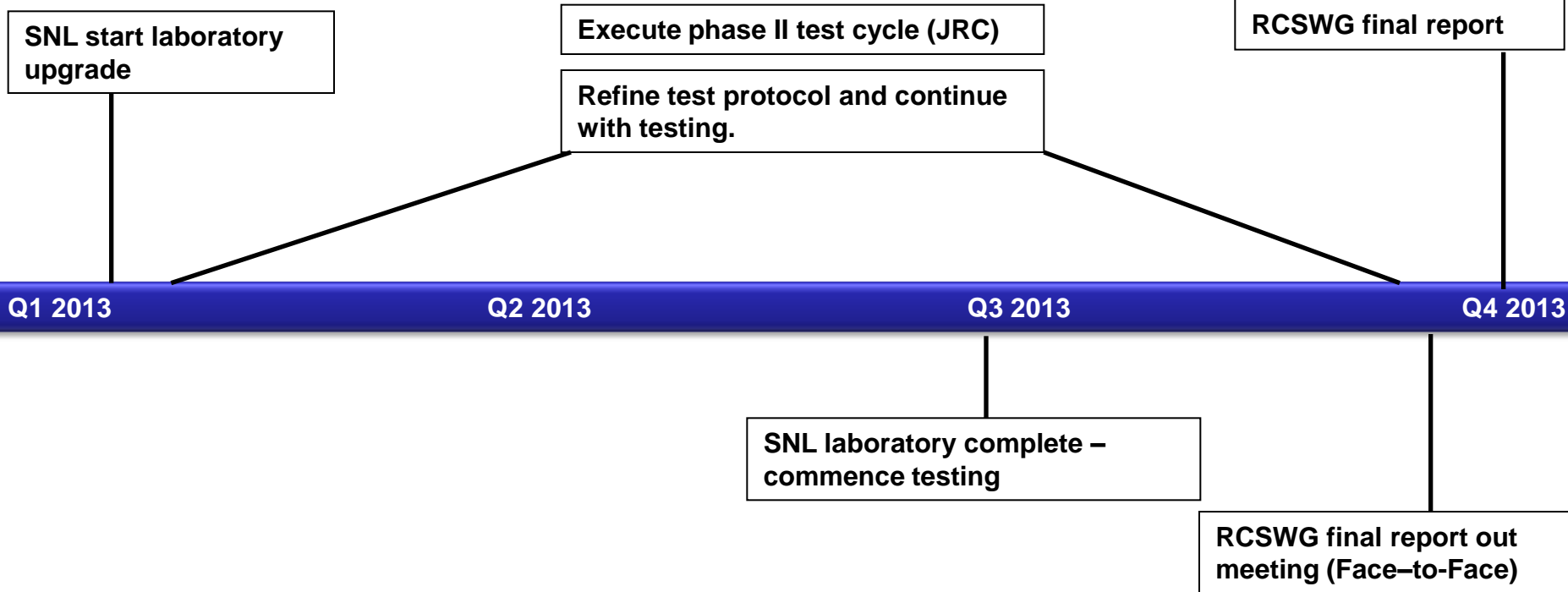


RCS WG Round Robin Timeline - Pneumatic





RCS WG Round Robin Timeline - Pneumatic





Member Countries:

Country	Point of Contact	Alternate
Brazil	Sergio Oliveira	Newton Pimenta
Canada	Aaron Hoskin	
China	Jinyang Zheng	
European Commission	Marc Steen	Pietro Moretto
France	Pierre Serre-Combe	Laurent Antonii
Germany	Thorsten Herbert	
India	Mishra Ambrish	
Italy	Romano Borchielline	Massimo Santarelli
Japan	Kazuo Koseki	Akiteru Maruta
New Zealand	Alister Gardiner	
Norway	Gerd Petra Haugom	
United Kingdom	Stuart Hawksworth	
United States	Antonio Ruiz	Jay Keller

- **Note – Countries noted in dark blue are the most active**
- **Note – No contacts yet from Australia, Iceland, South Africa and South Korea**



Next Steps

Face-to-face Meeting in Japan in conjunction with the JFC Expo (Q1 2013)

- Discuss status and progress of tank testing
- Commission a Fuel Quality stack testing Task Force to define Fuel Quality RR (*pending endorsement by SC*)
- Include standing agenda item to discuss release events

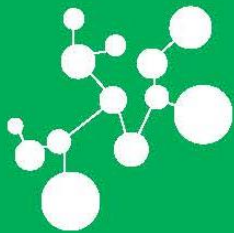


In view of renewed interest in Hydrogen and Fuel Cell technology deployment and infrastructure build up in a number of IPHE member countries:

- ***the RCSWG re-iterates its recommendation to the SC to secure the political and/or financial support in the member countries to ensure success of this IPHE sanctioned working group.***



Thanks to SC for the official IPHE endorsement of ICHS-5 2013



**ICHS2013 International Conference
on Hydrogen Safety**

September 9-11, 2013 - Brussels - Belgium



Thanks to the SC and all IPHE member countries

